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The body of the work deals with the horizontal and vertical distribution of the species. Of the 200 species, 11 only are rated as arctic, whereas 81 are termed subarctic, and 108 boreal; of the last, 12 are even warm boreal species extending south to the Mediterranean. In considering the vertical distribution, JÓNSSON terms the upper part of the shore, from the upper limit of algal growth to the low-water mark of neap tide (almost coinciding with the lower limit of the *Fucaceae*), the upper littoral zone. The lower littoral zone extends from here to the usual low-water mark of spring tide. Then begins the vegetation that is constantly submerged. In the upper littoral zone there are 18 reds, 18 browns, 36 greens, and 6 blue-greens; the great bulk of the vegetation, however, is composed of browns. Furthermore, 13 of the reds in the upper littoral zone occur in shaded clefts, being proper to lower zones. In the lower littoral zone there are 39 reds, 37 browns, and 17 greens; the relationship of these is much closer to the submerged species than to the upper littoral species. Of the submerged or sublittoral species, 39 are reds, 22 browns, and 3 greens. It is possible that algae may occur as far down as 80 meters, but they are not abundant below 60 meters. A third of the work is devoted to a detailed account of the numerous algal associations of the three zones noted above, the littoral associations being subdivided into those of the light and of the shade.

This valuable treatise closes with some notes on the duration of algae and periodical changes. The perennial algae, such as *Fucus* and *Laminaria*, have only a very short period of rest, in spite of the long winter; some species hardly rest at all. *Pelvetia caniculata* vegetates and fruits the year around.—H. C. COWLES.

#### Postglacial changes in German vegetation

HAUSRATH,<sup>3</sup> professor of forestry at Carlsruhe, has issued an extremely useful little book, which gives in compact form a summary of our knowledge regarding landscape and vegetation changes in Germany since the Ice age. One of the author's chief objects is to explain the present landscapes in terms of past conditions. To give proper orientation to the reader, HAUSRATH presents in brief fashion the ordinary fundamentals of phytogeography, noting the various factors and formations that are in evidence in Germany. It is interesting to note that nearly half the land of Germany is cultivated, one-quarter forest-covered, and one-sixth pasture and meadow. The various views concerning the climate of the Ice age and of subsequent times from the Ice age to the days of the Romans are well set forth, as are the probable stages in the re-establishment of vegetation immediately following the retreat of the glaciers. A chapter is devoted to changes subsequent to Roman occupation,

<sup>3</sup> HAUSRATH, HANS, *Pflanzengeographische Wandlungen der deutschen Landschaft. Wissenschaft und Hypothese XIII.* pp. vi+274. Leipzig: B. G. Teubner. 1911. M 5.

and there are here depicted the early periods of forest destruction, the fluctuations in forest area associated with peace and war, and the growth of the ideas of conservation and afforestation. The closing chapters consider changes in the composition of forests and the problems of heaths and moors, which are discussed from the viewpoint of origin, of destiny if left to themselves, and of utilization by man. The great merit of this volume lies in its strongly dynamic attitude, an attitude that cannot be too highly commended in all phytogeographic work.—H. C. COWLES.

### The trees of Belgium

MASSART<sup>4</sup> has issued a profusely illustrated little book on the trees of Belgium, his object being to present the subject so as to interest intelligent lovers of the woods, rather than to make a manual for botanists or foresters. The book is in no sense designed as a manual of identification, but rather it presents the interesting problems about which the nature-lover is likely to inquire. In the first portion of the book MASSART considers wood structure and tree architecture. Then follows a section on the relation between trees and soil, and a similar section on the relation between trees and the atmosphere. The final section presents the life-history of trees, dealing with birth, competition, decrepitude, and death. In the chapter on tree architecture, the author discusses deliquescent and excurrent trees, regeneration of injured terminal and lateral branches, the influence of isolation on the shape of the crown, and enlarged trunk bases. The section on soil relations considers the distribution of trees (an excellent detailed map of the Belgian woodlands accompanies this), the influence of the soil on trees, and the influence of trees on the soil; among the topics treated under the latter heading are rock disintegration, fixation of dune sand, and chemical changes in the soil. In the final section much attention is paid to tree diseases and insect pests. It is a pity that we do not have many similar books to accommodate the rapidly increasing army of nature-lovers.—H. C. COWLES.

### NOTES FOR STUDENTS

**The vegetation of the Nebraska sandhills.**—The average traveler regards the prairies and plains as regions of extreme monotony; particularly is this true if his way takes him through a region of sandhills. The total incorrectness of this view is admirably illustrated by the publication of Pool's researches in the Nebraska sandhills.<sup>5</sup> From an earlier and semipopular presentation

<sup>4</sup> MASSART, J., *Nos arbres*. pp. viii+214. *figs.* 238. *map* 1. Brussels: Henri Lamertin. 1911.

<sup>5</sup> POOL, RAYMOND J., A study of the vegetation of the sandhills of Nebraska. *Minn. Bot. Studies*, III. 4:189-312. *pls.* 15. *figs.* 16. *map* 1. 1914.